

REMARKS

Claims 1, 3-15 and 17-33 are pending in this application. Claims 21-28 have been withdrawn. Claims 1 and 29 are herein amended. New claims 30-33 are added. No new matter has been added.

Claim Rejections under under 35 U.S.C. §102

Claims 1, 3-15, 17-20 and 29 were rejected under 35 U.S.C. §102(e) as allegedly being anticipated by Kanno et al. (U.S. Patent Publication No. 2004/0106531). Applicants respectfully traverse this rejection.

The presently claimed cleaning agent for a substrate consist essentially of [I] an organic acid having at least one carboxyl group, [II] a complexing agent, [III] at least one organic solvent selected from the group consisting of (1) monohydric alcohols, (2) alkoxyalcohols, (3) glycols, (4) glycol ethers, (5) ketones and (6) nitriles, and [IV] water; wherein the total concentration of organic solvent(s) in the cleaning agent is 0.05 to 40% by weight; and pH of the cleaning agent is 0.5 to 6.5. Another embodiment of the presently claimed cleaning agent for a substrate consist essentially of [I] an organic acid having at least one carboxyl group, [II] a complexing agent, and [III] at least one organic solvent selected from the group consisting of (1) monohydric alcohols, (2) alkoxyalcohols, (3) glycols, (4) glycol ethers, (5) ketones and (6) nitriles, [IV] water and [V] at least one component selected from the group consisting of a reducing agent, a metal corrosion inhibitor and a surfactant; wherein the total concentration of the organic solvent(s) in the cleaning agent is 0.05 to 40% by weight; and pH of the cleaning agent is 0.5 to 6.5.

Kanno et al. does not anticipate each and every feature the presently claimed cleaning agent.

The presently claimed cleaning agent consist essentially of components [I]-[IV] or consist essentially of components [I]-[V], as recited in the claims of the present application. Another feature of the presently claimed cleaning agent is that the total concentration of the organic solvent(s) in the cleaning agent is 0.05 to 40% by weight and the pH of the cleaning agent is 0.5 to 6.5.

The presently claimed cleaning agent does not contain any component that would materially affect the basic and novel characteristics of the presently claimed cleaning agent. The presently claimed cleaning agent does not contain any organic solvent that would materially affect the basic and novel characteristics of the presently claimed cleaning agent. The presently claimed cleaning agent does not contain organic solvents exception (1) monohydric alcohols, (2) alkoxyalcohols, (3) glycols, (4) glycol ethers, (5) ketones and (6) nitriles. Furthermore, the total concentration of the organic solvent(s) of (1)-(6) in the cleaning agent is 0.05 to 40% by weight.

In the current Office Action, Example 32 of Kanno et al., which comprises 21% by weight of DGME, which corresponds to the presently claimed organic solvent (2) glycol ethers, is cited to assert that the presently claimed cleaning agent is anticipated. However, Example 32 of Kanno et al. also comprises 49% by weight of dimethyl sulfoxide. Thus, the total concentration of organic solvent in Example 32 of Kanno et al. is greater than 40% by weight. Furthermore, Applicants respectfully hold that dimethyl sulfoxide would be excluded from the presently claimed cleaning agent.

The composition of Kanno et al. comprises hydrofluoric acid. See Kanno et al., claim 1. Hydrofluoric acid would materially affect the basic and novel characteristics of the presently claimed cleaning agent. The presently claimed cleaning agent does not contain hydrofluoric acid. As disclosed in the present specification, use of hydrofluoric acid is not desirable. See present specification, paragraphs [0078] and [0045], herein reproduced.

In this connection, in the present invention, *use of the following compounds is not desirable: compounds which dissolve the metal corrosion inhibiting film* (particularly a Cu-BTA film) formed on the substrate surface by decreasing pH value of the cleaning agent (*for example, an inorganic acid such as hydrochloric acid, nitric acid, sulfuric acid, phosphoric acid and hydrofluoric acid*), compounds which oxidize the metal corrosion inhibiting film (for example, an oxidizing agent such as phosphorus acid), and compounds which cause a defective Cu wiring or dissolution of Cu by specifically reacting with Cu ion to form a complex with Cu (for example, phenanthroline or derivatives thereof). (emphasis added)

For at least the reasons herein presented, the present claimed cleaning agent is novel from Kanno et al.

Favorable reconsideration is earnestly solicited.

Claim Rejections under 35 U.S.C. §103

Claims 1, 3-1 5, 17-20 and 29 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable Ikemoto et al (U.S. Patent Publication No. 2003/0181344). Applicants respectfully traverse this rejection.

The presently claimed cleaning agent for a substrate consist essentially of [I] an organic acid having at least one carboxyl group, [II] a complexing agent, [III] at least one organic solvent selected from the group consisting of (1) monohydric alcohols, (2) alkoxyalcohols, (3) glycols, (4) glycol ethers, (5) ketones and (6) nitriles, and [IV] water; wherein the total concentration of organic solvent(s) in the cleaning agent is 0.05 to 40% by weight; and pH of the cleaning agent is 0.5 to 6.5. Another embodiment of the presently claimed cleaning agent for a substrate consist essentially of [I] an organic acid having at least one carboxyl group, [II] a complexing agent, and [III] at least one organic solvent selected from the group consisting of (1) monohydric alcohols, (2) alkoxyalcohols, (3) glycols, (4) glycol ethers, (5) ketones and (6) nitriles, [IV] water and [V] at least one component selected from the group consisting of a reducing agent, a metal corrosion inhibitor and a surfactant; wherein the total concentration of the organic solvent(s) in the cleaning agent is 0.05 to 40% by weight; and pH of the cleaning agent is 0.5 to 6.5.

The presently claimed cleaning agent consist essentially of components [I]-[IV] or consist essentially of components [I]-[V], as recited in the claims of the present application. Another feature of the presently claimed cleaning agent is that the total concentration of the organic solvent(s) in the cleaning agent is 0.05 to 40% by weight and the pH of the cleaning agent is 0.5 to 6.5.

Ikemoto et al. does not render obvious the presently claimed cleaning agent.

The presently claimed cleaning agent does not contain any component that would materially affect the basic and novel characteristics of the presently claimed cleaning agent. The presently claimed cleaning agent consisting essentially of components [I]-[IV] or consisting essentially of components [I]-[V], as recited in the claims of the present application, can remove only the carbon defect while maintaining the metal corrosion inhibiting effect, without removing a metal corrosion inhibitor – Cu film, in particular, a Cu-BTA film. Applicants respectfully hold that the presently claimed cleaning agent does not contain alkali compound.

The composition of Ikemoto et al. comprises oxymethylamine compound. Ikemoto et al. discloses that the oxymethylamine compound serves as an alkali. See Ikemoto et al, paragraph [0045].

Applicants respectfully hold that since the presently claimed cleaning agent does not contain alkali compound, such as oxymethylamine compound, which is present in the composition of Ikemoto et al., the presently claimed cleaning agent cannot be rendered obvious by the composition of Ikemoto et al.

Thus, the presently claimed cleaning agent is nonobvious from the composition of Ikemoto et al.

Furthermore, Applicants respectfully disagree with the Examiner's assertions in the current Office Action.

In the current Office Action, it was asserted that Ikemoto et al. teaches that the composition may contain relatively large amounts up to 30% of acid such as citric acid (See para. 48 of Ikemoto et al) which would allow for the formulation of compositions having the same pH values as recited by the instant claims. Thus, the teachings of Ikemoto et al are sufficient to render the claimed invention obvious under 35 USC §103. Applicants respectfully disagree.

In the field of resist stripping, as disclosed in Ikemoto et al, there is technological common sense to hold that the pH of the composition of Ikemoto et al. is alkaline. An alkaline composition can remove a resist, whereas an acidic composition cannot remove a resist. See disclosure of Ikemoto, including paragraphs [0003] and [0005].

Applicants respectfully hold that the composition of Ikemoto et al. is alkaline. This is evidenced by the examples disclosed in Ikemoto et al. Thus, even if the composition of Ikemoto et al. contained citric acid, the alkali compound is present in greater concentration, so that despite the percent by weight of the citric acid, said composition would be alkaline and be able to remove a resist. See Ikemoto et al. Examples 16 and 17.

In contrast, in the presently claimed cleaning agent, said cleaning agent can remove a carbon defect without removing a metal corrosion inhibiting film, wherein the liquid of the solution is acidic.

Therefore, at least the acidity feature of the presently claimed cleaning agent is not rendered obvious by Ikemoto et al. Favorable reconsideration is earnestly solicited.

Application No.: 10/577,129
Art Unit: 1761

Amendment
Attorney Docket No.: 062398

In view of the above, Applicants respectfully submit that the claimed invention is allowable and ask that the rejection under 35 U.S.C. §102 and the rejection under 35 U.S.C. §103 be reconsidered and withdrawn. Applicants respectfully submit that this case is in condition for allowance and allowance is respectfully solicited.

If any points remain at issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the local exchange number listed below.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP

/BERNADETTE K. MCGANN/

Bernadette K. McGann
Attorney for Applicants
Registration No. 65,127
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

BKM/bam